Electronic Supplementary Material (ESM)

Cobalt-modulated dual emission carbon dots for a ratiometric fluorescent vancomycin detection

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Fluorescence quantum yields (QYs) of DECDs

The QYs of DECDs were calculated using quinine sulfate (0.1 M H_2SO_4 as solvent) as a standard reference, i.e., at the excitation wavelength of 350 nm, its QY was 56% in 0.1 M H_2SO_4 solution. The fluorescent spectra of quinine sulfate, DECDs were measured at excitation wavelengths of 350 nm and the absorbance was kept under 0.05. The QYs were calculated according to the following equation:

$$\phi_{Sm} = \phi_{Qs} \times \frac{F_{Sm}}{F_{Qs}} \times \frac{A_{Qs}}{A_{Sm}} \times \frac{\eta_{Sm}}{\eta_{Qs}}$$

where Q denotes the QY of DECDs; F and A are the integral area of fluorescence emission peak and UV–Vis absorbance intensity at excitation wavelength, respectively; η is the refractive index of the solvent; and the Qs and Sm represent quinine sulfate and the DECDs, respectively.

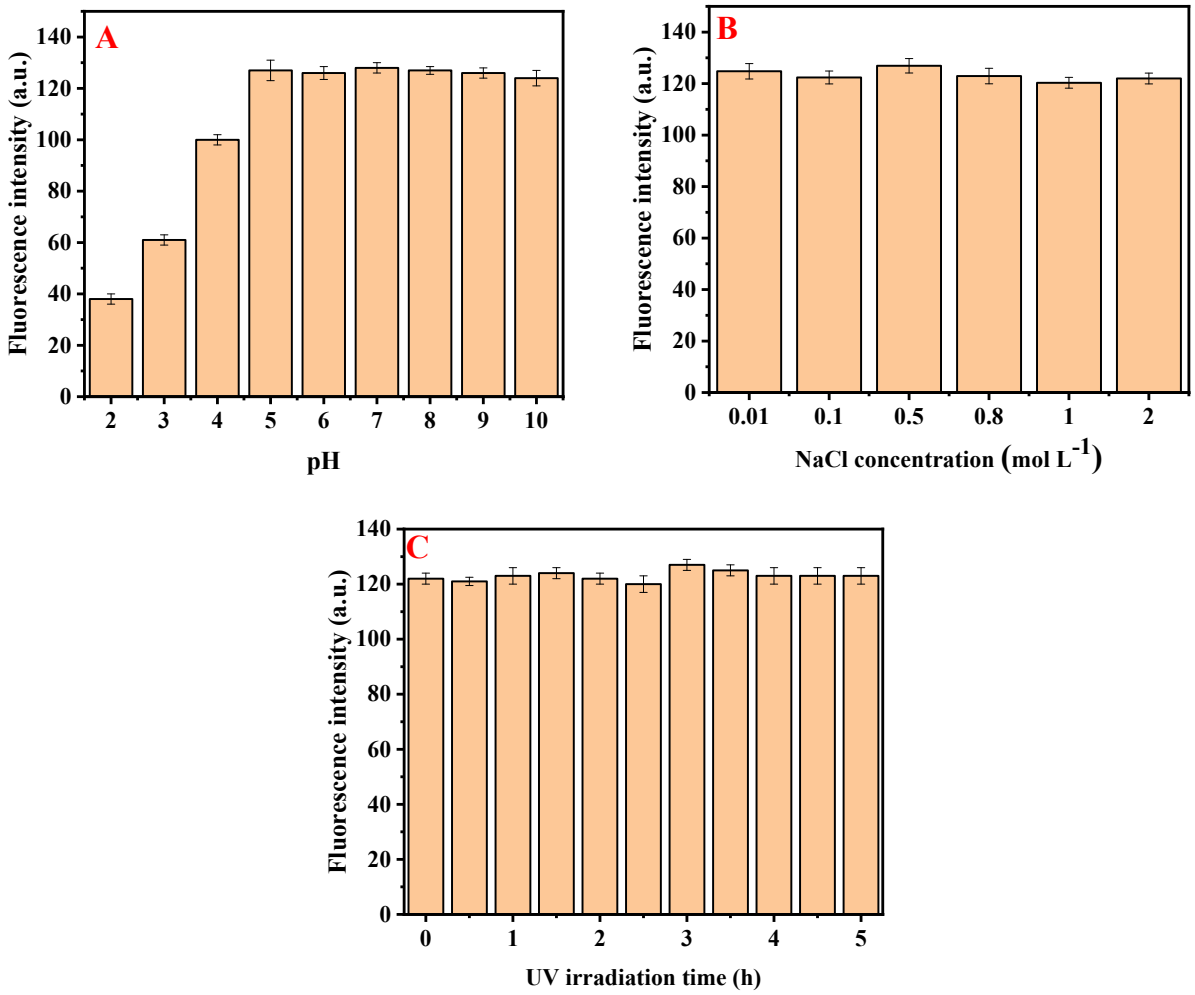

Fig. S1. Stability of the fluorescence response of DECDs under various conditions: (A) Effect of pH (2–10), (B) Effect of NaCl concentration (0.01–2.0 mol L^{-1}), (C) Effect of UV irradiation time (0–5 hrs) on fluorescence intensity of DECDs.

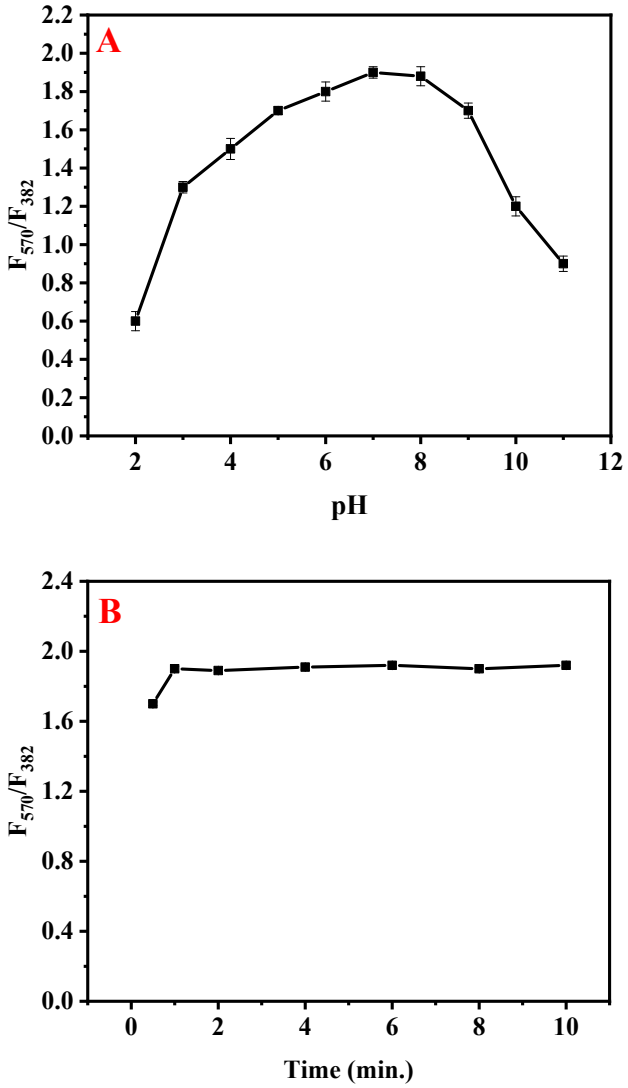

Fig. S2. Influence of (A) pH (2–11), and (B) reaction time (0.5–10 min.) on fluorescence intensity ratio F_{570}/F_{382} for detection of vancomycin (35.0 ng mL^{-1}).

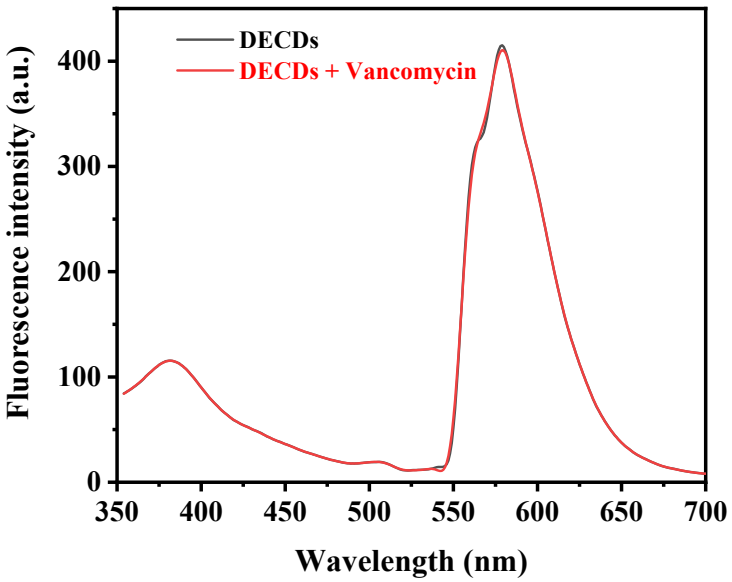

Fig. S3. Fluorescence spectral overlay of DECDs (0.5 mg mL^{-1}) before and after addition of vancomycin (100 ng mL^{-1}).